Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)
	)
2000 Biennial Regulatory Review –	)
Streamlining and Other Revisions of	) IB Docket No. 00-248
Part 25 of the Commission's Rules	)
Governing the Licensing of, and	)
Spectrum Usage by, Satellite Network	)
Earth Stations and Space Stations	)
	)

COMMENTS OF INTELSAT, LTD.

Intelsat, Ltd. ("Intelsat") submits these comments in response to the

Petition for Partial Reconsideration filed by The Boeing Company ("Boeing") of the

Sixth Report and Order in the above-captioned proceeding (the "Boeing Petition").[1]

In its Petition, Boeing urged the Commission to modify the starting angle

of the antenna gain pattern for Earth Stations on Vessels ("ESVs").[2] Specifically, Boeing

argued that the Commission should increase the angle at which the mask commences

from 1.25° to 1.5° or 2.0°, depending on how the ESV operator takes into account ESV

pointing errors.[3]

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[1]   *2000 Biennial Regulatory Review – Streamlining and Other Revisions of Part 25 of the Commission's Rules Governing the Licensing of, and Spectrum Usage by, Satellite Network Earth and Space Stations*, Sixth Report and Order and Third Further Notice of Proposed Rulemaking, IB Docket No. 00-248, FCC 05-62, rel. Mar. 15, 2005 ("*6th R&O*" and "*3rd Further Notice*").

[2]   Boeing Petition at 5.

[3]   *Id.* at 6.

As Boeing explained, starting the mask at 1.5° would be consistent with the approach the Commission adopted for other kinds of earth stations (such as VSATs) in the same proceeding,[4] and there is no technical reason not to extend the approach to ESVs.[5] Further, the 1.5° mask was derived conservatively, in view of the fact that mispointing could increase off-axis power levels.[6] Boeing noted that, if antenna pointing errors are taken into account by the system operator in controlling the off-axis EIRP density, then a 2.0° angle should be employed as the start of the mask.[7]

Intelsat agrees with Boeing. Indeed, Intelsat made a similar proposal[8] in the Commission's proceeding to adopt procedures to govern ESV operations,[9] urging the Commission to extend the starting angle of the ESV off-axis EIRP density envelope for

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[4] The Commission decided to begin the C- and Ku-band antenna gain pattern envelopes at 1.5°, instead of the 1.0° (C-band) and 1.25° (Ku-band) starting points of the prior rules. *6th R&O*, ¶¶ 22, 25. The Commission has noted that any rules adopted in the instant proceeding could apply to ESV operations. *Procedures to Govern the Use of Satellite Earth Stations on Board Vessels in the 5925-6425 MHz/3700-4200 MHz Bands and 14.0-14.5 GHz/11.7-12.2 GHz Bands*, Notice of Proposed Rulemaking, IB Docket No. 02-10, FCC 03-286, rel. Nov. 24, 2004, ¶ 53, n.92.

[5] Boeing Petition at 7.

[6] The amount of mispointing that could occur was not quantified, but the Commission considered the potential impact of 0.3°, 0.4°, and even 0.5° of mispointing. *See 6th R&O*, ¶ 22.

[7] Boeing Petition at 6.

[8] Opposition and Comments of Intelsat, Ltd., IB Docket No. 02-10, April 21, 2005, at 18-21 ("Intelsat ESV Proposal"). Although submitted in the ESV proceeding, Intelsat noted that the Commission could choose to consider Intelsat's ESV proposal in the instant proceeding (IB Docket No. 00-248), given the linkage of issues in the two proceedings, consistent with Boeing's approach in the Boeing Petition. *Id.* at 19, 22.

[9] *Procedures to Govern the Use of Satellite Earth Stations on Board Vessels in the 5925-6425 MHz/3700-4200 MHz Bands and 14.0-14.5 GHz/11.7-12.2 GHz Bands*, Report and Order, IB Docket No. 02-10, FCC 04-286, rel. Jan. 6, 2005 (the "*ESV Order*").

both C-band and Ku-band systems.[10] As Intelsat explained, this would further the

consistency of Commission rules, and facilitate use of smaller ESV antennas, while still

ensuring protection of adjacent satellites.[11]

Like Boeing, Intelsat noted that, for ESVs, where mispointing is limited

to 0.2°, there is no need to be as conservative in selecting the start of off-axis EIRP

envelope, so long as the mispointing limit is enforced.[12] In view of these considerations,

Intelsat proposed to re-derive the ESV off-axis EIRP mask to take into account the

variability that the currently allowed 0.2° mispointing can cause (counting the off-axis

angle from the axis linking the ESV antenna and associated satellite), extend the start of

the mask by an amount consistent with that mispointing assumption, and then, to ensure

that the possibility of greater mispointing does not undermine the assumption, apply the

Commission's ESV shutdown requirement to any violation of the resulting mask.[13]

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[10] The technical considerations are the same for the off-axis EIRP density envelope discussed by Intelsat and the antenna gain pattern discussed by Boeing. The off-axis EIRP density envelope is simply the sum of the antenna gain pattern and the power density at the input of the antenna. For this reason, the Commission proposed to also use the 1.5° starting point for any off-axis EIRP density envelopes that it might adopt in this proceeding. *3rd Further Notice*, ¶ 78.

[11] Intelsat ESV Proposal at 18. As the Commission has stated, one of its goals is to provide ESV operators maximum flexibility in implementing the required protection of adjacent FSS satellites. *ESV Order*, ¶ 14.

[12] Intelsat ESV Proposal at 19; Boeing Petition at 6.

[13] *See ESV Order*, ¶¶ 58, 104. In this case, the shutdown requirement would be recast so that it is an exceedence of the envelope conditions, and not any particular mispointing angle, that triggers the shut-down requirement.

According to this approach, the Commission's envelope would first be adjusted to take into account the incorporation of the ±0.2° mispointing limit.[14] An ESV conforming to the uplink off-axis EIRP density envelopes contained in the *ESV Order*, and meeting the ± 0.2° pointing accuracy requirement, would radiate, in the worst case, an uplink off-axis EIRP density, as measured from the axis linking the ESV and the satellite with which it operates, the equivalent of the envelope of the *ESV Order* shifted in the positive direction by 0.2°.[15] Such adjustment does not increase at all the levels of off-axis EIRP density permitted under the rules adopted in the *ESV Order*, and should

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[14] Intelsat ESV Proposal at 20-21.

[15] In other words, if the *ESV Order* envelope allows an uplink off-axis EIRP density of X dBW/4kHz at an off-axis angle φ as measured from the main beam axis of the ESV transmit antenna, and Y dBW/4kHz at an off axis angle equal to ($\varphi - 0.2°$) measured from the same reference, the ESV antenna could radiate Y dBW/4kHz in the direction φ as measured from the axis linking the ESV to the operating satellite, and still be compliant with the envelope of the *ESV Order*. This results in the following envelopes:

For C-band:

Maximum EIRP Density	Unit		Off-Axis Angle
$26.3 - 25 \log (\theta - 0.2)$	dBW/4kHz	for	$1.2° \leq \theta \leq 7.2°$
5.3	dBW/4kHz		$7.2° < \theta \leq 9.4°$
$29.3 - 25 \log (\theta - 0.2)$	dBW/4kHz		$9.4° < \theta \leq 48.2°$
-12.7	dBW/4kHz		$48.2° < \theta \leq 180°$

And for Ku-band:

Maximum EIRP Density	Unit		Off-Axis Angle
$15 - 25 \log (\theta - 0.2)$	dBW/4kHz	for	$1.45° \leq \theta \leq 7.2°$
-6	dBW/4kHz		$7.2° < \theta \leq 9.4°$
$18 - 25 \log (\theta - 0.2)$	dBW/4kHz		$9.4° < \theta \leq 48.2°$
-24	dBW/4kHz		$48.2° < \theta \leq 180°$

Where θ is any angle in degrees from the axis linking the ESV to the satellite it operates with, along the geostationary arc.

therefore be considered entirely consistent with the requirement for ±0.2° pointing accuracy.[16]

The Commission would next extend the start of the mask consistent with the conclusions reached in the instant proceeding. If the ESV envelope is re-derived to include mispointing within the applicable limits, and if, as noted above, the ESV operator would be subject to a strict shutdown requirement if the envelope is exceeded for any reason, the start of the ESV envelope could begin at 2.0°. This appears consistent with the analysis in the instant proceeding, which was necessarily conservative due to the unquantified nature of the mispointing.[17] It also is consistent with the Commission's ±0.2° mispointing limitation, with the further advantage of eliminating the discrepancy in

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[16] The Boeing Petition does not discuss this adjustment to the mask. However, in the ESV proceeding, Boeing argued that the permitted 0.2° mispointing should be considered "*de minimus*", and that the effects of tracking errors below this value "can be ignored." Consolidated Opposition to Petitions for Reconsideration or Clarification and Comments of the Boeing Company, IB Docket No. 02-10, April 21, 2005, at 5. Intelsat's proposal is consistent with such treatment, and should be adopted, to avoid inadvertently eliminating the flexibility inherent in the 0.2° mispointing allowance.

[17] Although the Commission found that it could start an antenna gain pattern envelope at 1.8° only if there were no possibility of pointing error, the Commission adopted 1.5° as the start of the mask taking into account 0.4-0.5° of mispointing, based on the existence of other compensating factors, such as the difference between topocentric and geocentric angles. *See 6th R&O*, ¶ 22. The same considerations apply here. Furthermore, as discussed above, the shutdown requirement would be strictly enforced. To avoid interruption of service, ESV operators would need to be conservative in controlling mispointing and power levels. Therefore, there is no need to also be unduly conservative in selecting the start of the mask, as was the case for other kinds of antennas for which mispointing is not strictly limited, nor included in the definition in the mask, and is, in fact, unbounded.

the current rules between the maximum mispointing of ± 0.2° combined with a shutdown requirement that is triggered only when mispointing reaches ± 0.5°.[18]

For the above reasons, Intelsat supports Boeing's proposal to extend the start of the antenna gain pattern for ESVs, and urges the Commission to adopt Intelsat's full implementation of that approach, described above, in the instant, or in the ESV, proceeding.

Respectfully Submitted,

Intelsat, Ltd.

By: /s/ Susan H. Crandall

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[18] In the rules adopted in the *ESV Order*, while the maximum mispointing is specified as ± 0.2°, cessation of transmissions is not required until the mispointing exceeds ± 0.5°. *ESV Order*, ¶¶ 58, 104; 47 C.F.R. §§ 25.221(a)(7), 25.222(a)(7).

CERTIFICATE OF SERVICE

I, Derrick Johnson, do hereby certify that on this 10th day of November 2005, I sent, via electronic mail, a true and correct copy of the foregoing Comments of Intelsat, Ltd. to the following:
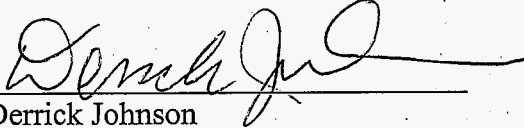
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